

## **Remarks**

This submission is made in response to the Office Action dated October 5, 2009.

## **Status of the Claims**

Claims 27-30 have been cancelled. Claims 1, 20, and 24 have been amended to specify that cellulose is excluded. Claims 1, 4-10, 12-15, and 17-26 are currently pending.

## **Election/Restriction**

Claims 27-30 directed to a non-elected invention have been cancelled.

## **Allowable Subject Matter**

The Applicant acknowledges the Examiner's finding of allowability of claims 6-10 and 22.

## **Rejections under 35 USC 102**

**Ottersbach** (CA 2,384,427): While the Examiner has withdrawn the objection to claims 12, 15, 17-20, and 22, the Examiner has maintained the objection to claims 1, 4-5, 13-14, and 21, 23-26 under 35 USC 102(b), in view of **Ottersbach**. It is respectfully submitted that Ottersbach does not teach amphiphilic copolymers having "one or more discrete hydrophobic segments and one or more discrete hydrophilic segments containing cationic functionality..." as presently claimed.

The Applicant has considered the Examiner's response to Applicant's arguments submitted with Applicant's response of May 20, 2009.

As Applicant previously submitted, Ottersbach does not teach an antimicrobial polymer containing discrete hydrophilic and hydrophobic segments with cationic functionality, since Ottersbach describes the random copolymerization of cationic monomers with other aliphatically unsaturated monomers. Applicant also pointed to the inverse temperature solubility of Applicant's polymers (common for amphiphilic polymers) as evidence for a discrete segmental structure. In addition, Applicant described the selective antimicrobial action of Applicant's polymer, which results from the discrete segmental structure.

The Examiner bases his disagreement of Applicant's argument on the description of graft polymerization of the Ottersbach copolymers on substrate polymers (which may be hydrophobic in nature). The Examiner considers that this grafting would provide a polymer with discrete hydrophobic (substrate polymer) and hydrophilic (graft polymerized polymer) segments with cationic functionality.

The Applicant respectfully disagrees with the Examiner's interpretation. As stated on page 6, lines 26-29 of Ottersbach,

The antimicrobial copolymers of the invention may also be obtained by copolymerizing monomers of the formula I or II or III with at least one aliphatically unsaturated monomer on a substrate. This gives a ***physisorbed coating made from the antimicrobial copolymer on the substrate***. [emphasis added]

The description then lists a number of suitable substrates, including polystyrenes, polyurethanes etc. (see page 7, lines 1-10).

Thus, Ottersbach describes various methods of randomly copolymerizing the defined monomers on a polymer substrate (which may be hydrophobic) to form an antimicrobial ***coating***. This coating may be physisorbed (page 6, lines 28-29) or covalently grafted (see page 7 at lines 12-17 of Ottersbach) to the polymeric substrate. The term "coating", which is used in all of the relevant examples (Examples 5 and 6) implies that the cationic copolymer forms a covering layer ***over*** the polymer substrate. Indeed lines 5 and 6 of page 9 describe a method of producing the cationic copolymer coating that results in "coherent coatings which cover the substrate surface and have thicknesses which can be more than 0.1  $\mu\text{m}$ ". Thus, in Ottersbach, the hydrophobic substrate could not directly influence the microbial interaction and help to impart bacterial specificity. For this reason, it is respectfully submitted that Ottersbach does not teach the formation of antimicrobial cationic polymers containing discrete hydrophilic and hydrophobic segments. In addition, the coatings so formed would not display the selective antimicrobial action that Applicant has demonstrated.

Since Ottersbach does not teach or suggest the claimed subject matter, it is respectfully requested that the Examiner withdraw the rejection under 35 USC 102(b) based on Ottersbach.

**Deets et al.** (U.S. 4,684,708): The Examiner has raised a new objection to claims 1, 5, 12-15, 18-21, and 23-26, saying that these claims are anticipated by Deets. The Examiner states that Deets teaches cationic starch graft copolymers that contain side chains of “hydrophobic polymer chains and cationic vinyl polymer chains”, making them essentially the same as Applicant’s claimed polymer.

Applicant respectfully disagrees. Deets does *not* describe graft copolymers that contain *discrete* hydrophilic and hydrophobic segments or *separate* hydrophilic and hydrophobic side chains.

In fact, Deets teaches a graft copolymer “comprised of a cationic starch upon which copolymer segments of nonionic and cationic vinyl monomers are grafted” (e.g. column 3, lines 56-58). In other words, Deets specifically describes grafting copolymer segments incorporating both hydrophilic and hydrophobic monomers, not separate hydrophobic and hydrophilic homopolymers. There is no mention of methods to produce discrete hydrophobic and hydrophilic graft segments. Rather, the graft copolymer chains are described as being formed by standard free-radical polymerization methods, meaning that there is no teaching towards producing anything other than random copolymer grafts.

Since Deets does not teach or suggest the claimed subject matter, it is respectfully requested that the Examiner withdraw the rejection under 35 USC 102(b) based on Deets.

**Chatterjee et al.** (U.S. 3,889,678): The Examiner has raised a new objection to claims 1, 4, 5, 12-15, 17-21, and 23-26, saying that these claims are anticipated by Chatterjee. The Examiner states that Chatterjee teaches cellulose graft copolymers containing side chains in which some of the side chains are polymers made from ionic monomers (i.e. hydrophilic) and other side chains are made from non-ionic monomers (i.e. hydrophobic), making the polymers essentially the same as Applicant’s claimed copolymers.

It is respectfully submitted that as presently claimed the Applicant’s polymers do not include any cellulose graft copolymers.

Since Chatterjee does not teach or suggest the claimed subject matter, it is respectfully requested that the Examiner withdraw the rejection under 35 USC 102(b) based on Chatterjee.

### **Conclusion**

In view of the above, it is respectfully submitted that all current rejections have been overcome and should be withdrawn. Should the Examiner not agree, then a telephonic interview is respectfully requested to discuss any remaining issues and to expedite the eventual allowance of this application.

No fee is believed to be due for this submission. However, the Commissioner is hereby authorized to charge any additional fees, and credit any over payments, to Deposit Account No. 501593, in the name of Borden Ladner Gervais LLP.

Respectfully submitted,

**MAY, Michael, H. et al.**

By: /Gail C. Silver/

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